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## Document Listing

Document	Image pages	Text pages	Error pages
US 6261881 B1	0	3	0
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DOCUMENT-IDENTIFIER: US 6261881 B1

TITLE: Semiconductor device provided with semiconductor circuit consisting of semiconductor element and method of manufacturing the same

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In the above respective manufacturing methods, the method is characterized by further comprising a step of forming as the gate insulating film a laminated film including, among other layers, one layer of a BCB (benzocyclobutene) film.

DEPR:

FIG. 13 illustrates the outline seen from the above of the apparatus shown in this embodiment (a serial film formation system). In FIG. 13, reference numerals 12 to 16 denote air tight chambers. A vacuum pump and an inert gas introducing system are arranged in each chamber.

DEPR:

All the chambers, after once have been vacuum-evacuated into highly vacuumed state, at first are in a purged state (atmospheric pressure) with inert gas, here, nitrogen. Also, all gate valves are brought into a closed state.

DEPR:

Next, a BCB (benzocyclobutene) film with a thickness of 100 nm to 1 .mu.m (preferably 500 to 800 nm) is formed as the first insulating film 503. At this step, the film thickness needs to be thick enough to completely flatten the level difference due to the gate wiring 502. Having a great effect in flattening, a BCB film of not so thick a film thickness may sufficiently flatten the difference.

DEPR:

As described above, a semiconductor film having a flat surface may be obtained by using as the first insulating film 503 a BCB film that is advantageous in flattening. Uniform crystallinity may therefore be ensured over the entire area of the semiconductor film.

DEPR:

In FIG. 5, every TFT (thin film transistor) is formed on the base film 501 provided on the substrate 500. In the case of the P channel type TFT in the CMOS circuit, the gate wiring 502 is formed on the base film, and the first insulating film 503 made of a BCB film and the second insulating film 504 are provided thereon. P regions 508 (a source region or a drain region) and a channel formation region 505 are formed as an active layer on the second insulating film. The active layer is protected by the protective film 509 that has the same shape as the active layer. Contact holes are formed in a first interlayer insulating film 510 that covers the upper surface of the protective film 509, wirings 511 and 512 are connected with the P regions 508, a second interlayer insulating film 516 is further formed thereon, an extraction wiring 517 is connected to the wiring 511 and a third interlayer insulating film 520 is formed thereon to cover the wirings.

CLPR:

10. A method of manufacturing a semiconductor device provided with a semiconductor circuit comprising a semiconductor element as claimed in claim 1, wherein said method further comprises a step of forming as said gate insulating film a laminated film including, among other layers, one layer of a BCB (benzocyclobutene) film.

CLPR:

17. A method of manufacturing a semiconductor device provided with a semiconductor circuit comprising a semiconductor element as claimed in claim 13, wherein said method further comprises a step of forming as said gate insulating film a laminated film including, among other layers, one layer of a BAB (benzocyclobutene) film.

CLPR:

25. A method of manufacturing a semiconductor device provided with a semiconductor circuit comprising a semiconductor element as claimed in claim 20, wherein said method further comprises a step of forming as said gate insulating film a laminated film including, among other layers, one layer of a BAB (benzocyclobutene) film.

CLPR:

33. A method of manufacturing a semiconductor device provided with a semiconductor circuit comprising a semiconductor element as claimed in claim 28, wherein said method further comprises a step of forming as said gate insulating film a laminated film including, among other layers, one layer of a BAB (benzocyclobutene) film.

CLPR:

41. A method of manufacturing a semiconductor device provided with a semiconductor circuit comprising a semiconductor element as claimed in claim 36, wherein said method further comprises a step of forming as said gate insulating film a laminated film including, among other layers, one layer of a BAB (benzocyclobutene) film.

CLPR:

49. A method of manufacturing a semiconductor device provided with a semiconductor circuit comprising a semiconductor element as claimed in claim 44, wherein said method further comprises a step of forming as said gate insulating film a laminated film including, among other layers, one layer of a BAB (benzocyclobutene) film.

CCXR:

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